QPL 38: RETAINING WALL SYSTEMS

RETAINING WALL SYSTEMS

NON PROPRIETARY CAST-IN-PLACE CONCRETE CANTILEVER, GRAVITY WALLS AND SOLDIER PILE WALLS (NO ANCHORS)

SECTION A: PROPRIETARY GRAVITY WALL SYSTEMS
QPL.38.001: BIN/CRIB/PRECAST LARGE FORMAT BLOCKS

QPL.38.002 GABION WALLS

SECTION B: MECHANICALLY STABILIZED EARTH WALL SYSTEMS
QPL.38.003: MSE WALL
(SEGMENTAL, PRECAST FACING)

QPL.38.004: MSE WALL
(MODULAR BLOCK FACING)

QPL.38.008: MSE WALL (OTHER FACING TYPES)

SECTION C: SPECIALTY WALL TYPES
QPL.38.005: ANCHOR WALLS, SOIL NAIL WALLS, SECANT/TANGENT WALLS ENGINEERING/INSTALL

QPL.38.006: ANCHOR WALLS, SOIL NAIL WALLS, SECANT/TANGENT WALLS ENGINEERING

QPL.38.007: ANCHOR WALLS, SOIL NAIL WALLS, SECANT/TANGENT WALLS INSTALL

INTRODUCTION

TDOT Contract Plans will specify retaining wall locations and specific retaining wall type(s) which must be utilized for the given wall location. For a given retaining wall, a single wall type or several wall types may be listed. For non-proprietary retaining walls such as cast-in-place concrete cantilever walls or soldier pile lagging walls (no anchors) there will not be an approved QPL 38 list. General requirements for design and construction for the non-proprietary walls are summarized below. Further details regarding design and construction requirements can be seen in the project contract plans and Special Provision 624.

NON-PROPRIETARY WALLS: CAST-IN-PLACE CONCRETE CANTILEVER WALLS, CAST-IN-PLACE GRAVITY WALLS, SOLDIER PILE LAGGING WALLS (NO ANCHORS)

See contract plans and Special Provision 624 for design requirements of these walls and for contractor prepared plans (also known as Shop Drawings) and calculations. No Qualified Products List will be generated for these type walls. Wall designers, contractors and material suppliers must conform to applicable TDOT requirements.

Initial System Approval.

PROPRIETARY RETAINING WALL SYSTEMS APPROVAL PROCESS (Section A and B).

This document provides requirements for proprietary retaining wall systems as listed for Sections A and B that are desired to be TDOT approved retaining wall systems. All proprietary retaining walls constructed within TDOT right-of-way or maintained by TDOT must be on the Approved Retaining Wall Systems List-QPL 38.

For retaining wall systems to be included in the Approved Retaining Wall Systems List, the system must go through an approval process as outlined below:

Step 1: Request for Consideration

A proprietary wall system owner's representative shall request in writing to the New Product Evaluation Section-Division of Materials and Tests the desire to have the wall system reviewed and placed on the QPL 38. The request shall provide a brief summary of the wall system including its basic theory and past history of successful construction on transportation related projects.

The New Product Evaluation Section will distribute copies of the request to persons in the Structures Division, Materials and Tests Field Operations and Geotechnical Section and any other persons within TDOT whom it may be determined desirable to review the request. These persons will review the submittal and will base whether the wall system is acceptable for consideration on the following factors:

(A) Does the system have a sound theoretical and practical basis for the engineers to evaluate its claimed performance?
(B) Does the proposed system demonstrate acceptable past experience in construction and performance?
(C) Does the system demonstrate acceptable long term level of maintenance issues and maintenance costs?

Step 2: Wall System Submittal

If the wall system is determined to be accepted for consideration, the New Products Evaluation Section will contact the wall system representative to request a package to be submitted which must include one of the following three options for submittal:

Option I: A system evaluation final report prepared by the Highway Innovative Technology Evaluation Center (HITEC). For information regarding the HITEC process call Muhammad Amer (703) 295-6392, mamer@asce.org.

Option II:

A well-organized document including but not limited to (Note: for certain wall types some of the items listed below will not be applicable):

A. wall system history, including the year it was first used,
B. wall system theory and how the theory was developed,
C. laboratory and field experiments which support the theory,
D. practical applications with descriptions, color photos, and/or videotape,
E. details of wall elements, including facing unit, metallic/geosynthetics reinforcement, connection devices, backfill, leveling pad, bearing pad, filter fabric, drainage elements, coping traffic barrier, etc.,
F. analysis of structural elements, design calculations, factors of safety, estimated life,
G. corrosion design procedure for metallic reinforcement, including procedures and data for field and laboratory evaluation.,
H. creep, durability, installation damage factors for geosynthetics reinforcement, including procedures and data for field and laboratory evaluation,
I. detailed long hand internal and external design calculations for the design cases, using LRFD methodology as shown in Appendix A,
J. explanation of computer software used in the design process along with sample printout of input and output results, using LRFD methodology for the design cases shown in Appendix A,
K. limitations and disadvantages of the system,
L. performance history, any known problems or failures of the system, including where, when how and why it failed,
M. list of users (other states, etc.) including contact names, addresses and phone numbers.

N. documentation that at least 25,000 square feet of the specific wall system has been completed on either a Federal or State highway project.

O. sample material and construction control specifications-showing material type, quality, certifications, field testing, acceptance and rejection criteria (tolerances and placement procedures,

P. a well-documented field construction manual describing in detail, and with illustrations where necessary, the step by step construction sequence, and any special equipment required,

Q. typical unit costs, supported by data from actual projects,

R. quality control/quality assurance procedures for materials, wall system, and engineering,

S. an explanation of the design process used for actual project designs. That is, does the Wall System owner have in-house engineers who provide the designs for specific projects or does the Wall system Owner allow independent engineers to provide designs of the wall system. If the latter, does the Wall System Owner provide any quality control measures for design oversight. Is the Engineer–of-Record properly defined for the wall design?

T. Information on wall system warranties and insurance coverage for responsible party.

U. Independent Design Review: At no expense to TDOT, the Wall System Owner must have the total wall system reviewed by an independent professional engineer(s), who is registered in Tennessee and is acceptable to TDOT engineers. The independent professional engineer(s) shall review all wall components, materials specifications, design concept, calculations, and construction procedures, for compliance with AASHTO and TDOT criteria. The independent professional engineer shall submit a formal evaluation report which determines if the wall system meets AASHTO and TDOT design, construction and material property criteria.

Option III: If the Wall System Owner has obtained approval from two other State DOT offices which utilize wall system approval procedures equivalent to Options I or II described above, the Wall System Owner may submit those documents as well as documentation of such approval by the two State DOT offices.

Regardless of the Option under which a retaining wall system is submitted to TDOT for review, TDOT reserves the right to request additional information regarding both technical and/or non-technical aspects of the wall system as deemed necessary for review and approval.

Department Action

The submittal package request will be disseminated by the New Products Evaluation Office to appropriate representatives of the Division of Structures, the Division of Materials and Tests and the Construction Division. The Department's position on the wall system (i.e., rejection or approval) will be provided to the Wall System Owner by written notification from the New Products Evaluation Office within ninety (90) days after receipt of all requirements of the submission including any additional information as requested by TDOT officials subsequent to the original submittal package.

After final review and approval by the appropriate TDOT officials, wall systems submitted under any Option, will be placed on the Qualified Products List by the New Products Evaluation Office.

In some instances a wall system may be given conditional approval which may limit the wall system to projects with a limited quantity of wall, a limited height of wall or some other special limitation (i.e. Wall is not approved for use in front of a bridge abutment.) The Wall System Owner will be informed of any conditional approval and the means by which the conditional approval will be removed.

Any changes/modifications to any particular wall system made subsequent to being on the approved list may necessitate a complete or partial re-submission by that Proprietor/Contractor and a re-evaluation by the Department. The Wall System Owner shall be responsible for informing the Department of any changes in a timely manner. The Department can disallow a particular wall system for let projects- even if it has been placed on QPL 38- if there have been changes made to the wall system that have not been evaluated by the Department.

The Department reserves the right to remove a wall system/supplier from the Approved Wall Systems list if, in the opinion of the Department, the wall system is not performing adequately, design and /or construction procedures are not being followed or other reasons that the Department deems justifiable cause for removal from the list. The Department will inform the wall system/supplier of the reasons for removal and will provide a means by which the wall system/supplier can request to be reinstated to the Approved Wall Systems list.

APPROVAL PROCEDURE FOR SECTION C, SPECIALTY TOP-DOWN WALL TYPES: ANCHOR WALLS, SOIL NAIL WALLS, SECANT/TANGENT WALLS

Firms requesting to be on approved List QPL 38.005 shall submit required information as described below to the New Products Evaluation Section. The information will be distributed to the appropriate persons in the Structures Division, the Materials and Tests Division and the Construction Division for review. Based on the results of review the New Products Evaluation Section will either place the Firm on QPL 38.005.X or inform the Firm that they are not approved or that additional information is required.

Approval and placement on QPL 38.005 will be based on Qualifications Requirements and will consist of the following three sub-categories:

QPL.38.005 Firms that have in-house personnel and equipment resources consisting of engineers/designers, technicians and subcontracting specialists associated with all aspects of Specialty Retaining Wall Construction. These firms are capable of completing wall designs, installing all components of the wall, provide required instrumentation/testing and demonstrate the ability to be responsible for all aspects of wall design and construction. Note: Firms meeting 38.005.1 automatically qualify for QPL.38.006 and QPL.38.007. Qualification Requirements 1,2,3,4 and 5 must be met.

QPL.38.006 Engineering Firms that have in-house personnel that are qualified in accordance with the applicable requirements below to provide specialty retaining wall design including all aspects and details of a wall design and oversight of implementation of the wall design. Qualification Requirements 2 and 5 must be met. .

QPL.38.007. Specialty Contractors/Subcontractors/Installers that have personnel and equipment resources which are qualified and capable of constructing and installing and testing ground anchors and/or soil nails. Qualification Requirements, 3,4 and 5 must be met.

Qualification Requirement 1.The Firm performing the design and construction of the work shall have a minimum of three (3) years of experience in anchored wall, soil nail, secant/tangent pile wall design and construction and shall submit evidence of successful completion of at least three (3) similar projects.

Qualification Requirement 2. The Firm's staff shall include at least one registered Professional Engineer licensed to perform work in the State of Tennessee. The Firm shall assign an engineer to supervise the work with at least three (3) years of experience in the design and construction of the specialty type walls for which qualification is desired.

Qualification Requirement 3. The Firm performing the work shall have installed permanent ground anchors,, soil nails or other applicable specialty ground improvement element for a minimum of three (3) years.

Qualification Requirement 4. The Firm shall assign a superintendent or foreman with a minimum of two (2) years experience in the supervision of anchored wall,, soil nail or the specialty type walls for which qualification is desired. The Firm may not use consultants or manufacturer's representatives in order to meet the requirements of this section.

Qualification Requirement 5. The Firm shall submit a list containing at least three (3) projects completed within the last three (3) years. For each project, the Firm shall include with this submittal,at a minimum: (1) name of client contact, address, and telephone number; (2) location of project; (3) contract value. (4), range of retaining wall dimensions for submitted projects.

Resumes of the Firm's staff shall be submitted to TDOT for review. Only those individuals designated as meeting the qualifications requirements shall be used for the project. The Firm cannot substitute for any of these individuals without written approval of the TDOT.

ADDITIONAL INFORMATION CONCERNING SPECIALTY WALL QUALIFICATIONS.

TDOT shall approve or reject the Firm's qualifications and staff within fifteen (15) working days after receipt of the submission.

Work shall not be started on any wall system nor materials ordered until the Firm's qualifications have been verified by TDOT. TDOT may suspend the work if the Firm substitutes unqualified personnel for approved personnel during design or construction. If work is suspended due to the substitution of unqualified personnel, the General Contractor shall be fully liable for additional costs resulting from the suspension of work and no adjustment in contract time resulting from the suspension of work will be allowed.

All Firms must also be approved in accordance and applicable with TDOT Consultant Pre-qualification requirements as administered by the Design Division and/or Contractor/Subcontractor pre-qualification requirements as administered by the Construction Division.

QPL 38 TIME LIMITATIONS

Placement on QPL 38 is valid for a three year time period. The entity requesting original approval shall submit request to the New Product Evaluation Section for re-qualification every three years. This submission shall consist of either:

1. A certified letter that states that the basis of original qualification, regarding product material properties, design details, software, or personnel (for those qualifications based on personnel requirements), has not changed.
2. A submittal package clearly explaining the nature of any changes made to the product, design details or qualified personnel. TDOT will review the submission and determine if re-qualification is approved.

It is the responsibility of the submitting entity to know when the qualification period expires. TDOT will not send notification of qualification expiration dates.

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